

Opener

- i) Find the vertex of the following function by completing the square

$$f(x) = 2x^2 + 10x - 7$$

- ii) Find the roots of the following function $f(x) = 3x^2 + 2x - 7$

Mar 24-8:14 AM

Opener

Find the vertex of the following function by completing the square

$$f(x) = 2x^2 + 10x - 7$$

$$\begin{aligned} f(x) &= 2x^2 + 10x - 7 \\ &= 2\left(x^2 + 5x - \frac{7}{2}\right) \\ &= 2\left(x^2 + 5x + \frac{25}{4} - \frac{25}{4} - \frac{7}{2}\right) \\ &= 2\left(x + \frac{5}{2}\right)^2 - \frac{25}{2} - 7 \\ &= 2\left(x + \frac{5}{2}\right)^2 - \frac{39}{2} \end{aligned}$$

Find the roots of the following function $f(x) = 3x^2 + 2x - 7$

$$\begin{aligned} a &= 3 \\ b &= +2 \\ c &= -7 \\ &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \\ &= \frac{-2 \pm \sqrt{2^2 - 4(3)(-7)}}{2(3)} \\ &= \frac{-2 \pm \sqrt{4 + 84}}{6} \\ &= \frac{-2 \pm \sqrt{88}}{6} \\ &= \frac{-2 \pm 9.4}{6}, \quad \frac{-2 - 9.4}{6} \end{aligned}$$

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4.4 Discriminant p227

- i) $b^2 - 4ac = +ve$ value

2 real roots

- ii) $b^2 - 4ac = 0$

1 real root

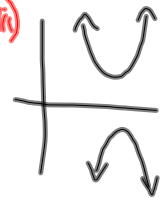
$$x^2 + 6x + 9 = 0 \quad (x+3)^2 = 0 \quad \text{Perfect Squares}$$



Mar 31-9:26 AM

4.4 p 227
Discriminant

- ii)



$$b^2 - 4ac = -ve$$

no solution

$$\sqrt{b^2 - 4ac}$$

no real roots

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Determine the # of roots for each equation

a) $4x^2 - 10x + 5 = 0$

$$D = b^2 - 4ac$$

$$a = 4 \quad b = -10 \quad c = +5$$

$$= (-10)^2 - 4(4)(5)$$

$$= 100 - 80$$

$$= 20$$

∴ 2 real roots

ii) $3x^2 + 5 = 0$

$$a = 3$$

$$b = 0$$

$$c = 5$$

$$D = b^2 - 4ac$$

$$= 0^2 - 4(3)(5)$$

$$= 0 - 60$$

$$= -60$$

No Real Roots

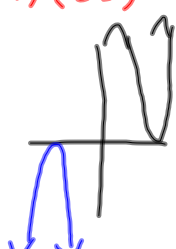


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$$4x^2 - 20x + 25$$

$a = +4$ $b^2 - 4ac$
 $b = -20$ $(-20)^2 - 4(4)(25)$
 $c = +25$ $400 - 400$
 $= 0$
 \therefore 1 real root



Oct 16-10:18 AM

For what value of k does $2x^2 + 4x + k = 0$ have two distinct roots, one solution? and no solution?

One solution

$$a = 2 \quad 0 = b^2 - 4ac$$

$$b = 4 \quad 0 = 4^2 - 4(2)(k)$$

$$c = k = (?) \quad 0 = 16 - 8(k)$$

$$-16 = -8k$$

$$\frac{-16}{-8} = \frac{-8k}{-8}$$

$$2 = k$$

$k > 2$ - no solutions
 $k < 2$ - two solutions
 $k = 2$ - one solution

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p 232-233

Hwk

$q_2, 4$ (odds) 6, 7, 9, 13

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Mar 24-8:41 AM